

OPTO-ELECTRIC DEVICE FOR MEASURING THE ROOT-MEAN-SQUARE VALUE OF AN ALTERNATING CURRENT VOLTAGE

Abstract of Disclosure

An opto-electric device for measuring the root mean square value of an alternating current voltage comprises : a) an electric field-to-light-to-voltage converter having 1) a light source; 2) an electro-optic material: (a) receiving light from the light source; (b) modulating said light; and (c) providing a modulated light output; 3) an electric field applied to the electro-optic crystal to modulate the light from the light source to produce the modulated light output; b) an optical receiver for receiving and converting the modulated output light from the electro-optic material to a first voltage that is proportional to a square of the electric field applied to the electro-optic material; c) an averager circuit receiving the first voltage and providing a second voltage that is proportional to the average of said square of said electric field over a period of time; and d) an inverse ratiometric circuit receiving the second voltage from the averager circuit and returning a third voltage that is an inverse voltage of the second voltage to the electric field-to-light-to-voltage converter to produce an output voltage that is the root mean square voltage of the applied electric field. The device uses a Mach-Zehnder interferometer operating as a square law device and features a housing for maintaining the interferometer at constant temperature using a temperature control unit. A nulling circuit is provided to maintain the interferometer at it null operating point as are calibration circuits to correct for voltage amplitude and frequency changes.